

Lepus flavigularis. By Fernando A. Cervantes

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Lepus flavigularis Wagner

Tropical Hare

Lepus callotis flavigularis Wagner, 1844:106-107. Type locality "México."

Lepus flavigularis: Nelson, 1909:125-126. First use of current name combination.

CONTEXT AND CONTENT. Order Lagomorpha, Family Leporidae, Subfamily Leporinae, Genus *Lepus*. The genus contains about 19 species (Honacki et al., 1982). *L. flavigularis* is monotypic (Hall, 1981; Ramírez-Pulido et al., 1986).

DIAGNOSIS. The hair of *L. flavigularis* is coarse and the color of the upperparts is bright ochraceous buff strongly washed with black. The ears are large, entirely buff with no black near the tip on the posterior half, and smaller than in *L. callotis*. The nape displays a black stripe extending posteriorly from the base of each ear, and a median stripe that is buff. The throat is yellowish, the flanks and the underparts of the body are white, and the rump is iron gray (Goodwin, 1969; Nelson, 1909). The yellow ears and the stripes on the nape are strongly diagnostic (Nelson, 1909). The tympanic bullae are smaller than in any other species of *Lepus* in México (Anderson and Gaunt, 1962; Hall, 1981), and the length of nasals and length of palatal bridge are greater than in *L. californicus* and *L. callotis* (Dixon et al., 1983).

GENERAL CHARACTERS. In worn spring pelage the black wash on the back is faded and the buff of the upperparts has faded to pale yellow, but the rich buff of the throat is always conspicuous (Nelson, 1909). In fresh autumn pelage, the top and sides of the head and the back are rich ochraceous buff and heavily washed with black. The nape has a broad median line of dull ochraceous buff separating two black stripes that begin on the posterior bases of the ears and extend posteriorly. These black stripes usually are narrow, and taper posteriorly to a slender point. In some specimens, especially those in worn pelage, the black stripes occur only as black patches on the posterior bases of the ears. The coloration of the nape is present invariably in all *L. flavigularis*, but is never present in *L. callotis* (Anderson and Gaunt, 1962). The remainder of the ear is dark ochraceous buff, with a slightly more richly colored border in some specimens. The rump and the back of the hind legs are iron gray. The front of the hind legs and the top of the hind feet are white, whereas the front of the forelegs varies from iron gray to grayish white, becoming paler and more buffy on the top of the forefeet. A black line extends along the middle of the rump and over the upper surface of the tail; the underside of the tail is gray. The throat region is rich ochraceous buffy and the remainder of the underparts is white. This white area extends up over the flanks and abruptly ends, as in *L. callotis*, against the iron gray area of the rump and hind legs (Nelson, 1909). The skull of *L. flavigularis* is relatively long and resembles that of *L. alleni*, but with proportionally smaller bullae (Fig. 1). The supraorbital and postorbital processes are short and broad as in *L. callotis*, but are joined more broadly to the skull. The supraorbital processes are joined closely to the skull anteriorly, and the anterior notch is obsolete or nearly so, giving a great frontal breadth. The postorbital process is attached to the skull posteriorly and the postorbital foramina are narrower than in



FIG. 1. Dorsal, ventral, and lateral views of the skull, and lateral and dorsal view of the mandible of *Lepus flavigularis* (adult male, Instituto de Biología, UNAM, 17479) from 1.5 km W Santa María del Mar, Municipio Juchitán, Oaxaca. Greatest length of skull is 98.9 mm.

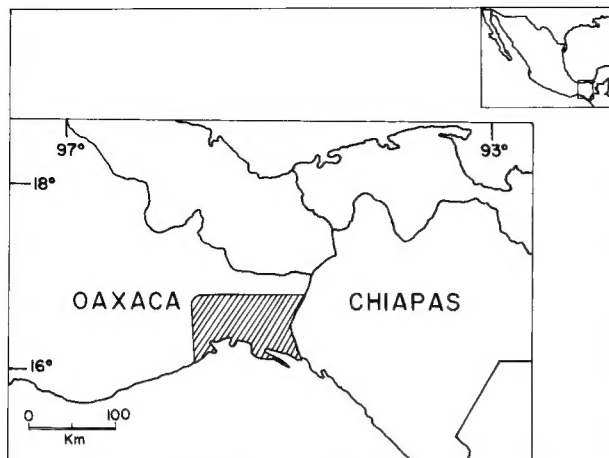


FIG. 2. Geographical distribution of *Lepus flavigularis* (after Anderson and Gaunt, 1962, and Hall, 1981).

most species of *Lepus*. The rostrum is compressed laterally, unusually high-arched, and tapers more rapidly toward the tip than in *L. callotis*. The nasals are long and tapered strongly forward. The bullae are smaller than in any other jackrabbit in México. The basioccipital is large, broad, and strongly constricted posteriorly (Goodwin, 1969; Nelson, 1909).

The ranges of external measurements (mm) for three male and four female adults from Santa María del Mar, Oaxaca, were: total length, 565–610; tail length, 65–95; hind foot, 115–134; ear from notch in dry skin, 107–119 (Goodwin, 1969). The cranial measurements (mm) of 44 adult *L. flavigularis* were (mean and range, respectively): basilar length, 75.0 (70.0–77.8); breadth of braincase, 31.7 (29.9–32.9); breadth of bullae, 30.7 (29.4–31.9); basioccipital constriction, 8.6 (7.8–9.6); frontal depression, 3.9 (3.2–4.7; Anderson and Gaunt, 1962).

DISTRIBUTION. *Lepus flavigularis* is endemic to southern Mexico, and has the most southerly distribution in the genus *Lepus* in North America (Goodwin, 1969; Hall, 1981). The species is entirely tropical in distribution (Fig. 2). In the early 1900s it was reported to occur in the coastal plains and bordering foothills of the southern side of the Isthmus of Tehuantepec, in southern Oaxaca, thence along the Pacific coast to a point beyond Tonalá, Chiapas. Its vertical range is from sea level to 666 m in southeastern Oaxaca, within the arid tropical zone (Nelson, 1909). A later report stated this hare was restricted to the coastal zone between Tehuantepec, Oaxaca, and Arriaga, Chiapas (Alvarez del Toro, 1977). More recently, Chapman et al. (1983) asserted that the reported distribution of *L. flavigularis* had been exaggerated, and they described its range as extending only from Salina Cruz, Oaxaca, to the extreme west of Chiapas.

ECOLOGY. In the state of Chiapas (Alvarez del Toro, 1977), *L. flavigularis* inhabits xerophytic areas dominated by sand dunes near tidelands, especially the area between Mar Muerto Lagoon and the sea. In Oaxaca, *L. flavigularis* is restricted to the sand dunes and shrub forest, never exceeding 4–5 km in width on the shores of the salt water lagoons of the northern rim of the Gulf of Tehuantepec. It occurs sympatrically with the eastern cottontail (*Sylvilagus floridanus*) throughout its range, is exclusively nocturnal, and is hunted extensively at night with firearms and with fishing throw nets (Chapman et al., 1983). Two adult females collected on 7 February 1981 were pregnant; one had two embryos fully developed with crown-rump lengths of 175 and 178 mm (Flux and Angermann, 1990). No ecological studies have been done on this species (Chapman et al., 1983). There is no fossil record.

This species is not intensively hunted in Chiapas, however, because it is elusive and people prefer the meat of the eastern cottontail (Alvarez del Toro, 1977). Several years ago *L. flavigularis* was abundant in part of the Municipio de Arriaga, Chiapas, between Mar Muerto Lagoon and the sea, but it now is scarce there due to the burning of vegetation by humans (Alvarez del Toro, 1977). The abundance of this hare in Oaxaca apparently has diminished drastically; no hares were seen in a recent survey. Local residents,

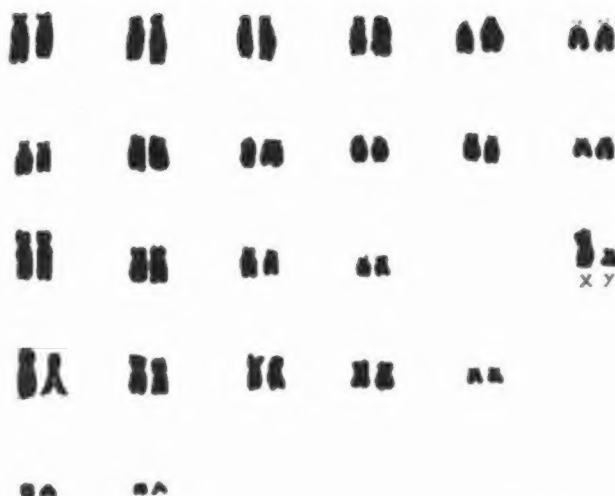


FIG. 3. Karyotype of a male *Lepus flavigularis* (adult, Instituto de Biología, Universidad Nacional Autónoma de México, 17482) from 1.5 km W Santa María del Mar, Municipio Juchitán, Oaxaca.

however, claim a few remain (López-Forment, 1989). *Lepus flavigularis* is a rare and endangered species (Angermann et al., 1990) once occupying an area of perhaps 150 km², but most of its habitat is being destroyed for agricultural space (Flux and Angermann, 1990).

GENETICS. The karyotype of *L. flavigularis* is characterized by a diploid number of 48 and a fundamental number of 88 (Uribe-Alcocer et al., 1989; Fig. 3). The 23 pairs of autosomes consist of 5 pairs of metacentric chromosomes ranging in size from medium to small, 4 pairs of submetacentric chromosomes ranging from large to small, 12 pairs of large to small subtelocentric chromosomes, and 2 pairs of small acrocentric chromosomes. The X chromosome is a large submetacentric, and the Y is a medium submetacentric. This species has the same chromosome number, fundamental number, and large X sex chromosome found in *L. alleni* and *L. californicus*. The chromosome number of *L. flavigularis* is the same as that of other members of the genus examined thus far, confirming the karyotypic conservatism of the genus (Uribe-Alcocer et al., 1989).

REMARKS. *Lepus flavigularis* and *L. callotis* are similar and were considered probably conspecific by Nelson (1909). Later it was shown that *L. callotis* occurs only to the west of the Isthmus of Tehuantepec and at higher elevations than *L. flavigularis* (Goodwin, 1969). A numerical analysis of morphological characters supported the original designation of *L. flavigularis* as a distinct species (Dixon et al., 1983). *L. flavigularis* is about the size of *L. callotis*, and is more similar to *L. callotis* than is either to *L. alleni* (Anderson and Gaunt, 1962). On the basis of morphological and distributional criteria, species of the *callotis* group (*L. callotis*, *L. flavigularis*, and *L. alleni*) are more closely related to *L. californicus* than to any other species of the genus (Anderson and Gaunt, 1962). A population of *L. californicus* probably became isolated in México and diverged into *L. callotis*. Later, a population of this divergent stock became isolated on the western coastal plain, differentiating further into *L. alleni*. In a small area in southeastern Oaxaca, a second isolated population evolved into *L. flavigularis* (Anderson and Gaunt, 1962). *Lepus flavigularis* is recommended for listing as endangered because its habitat is threatened by encroaching agriculture, and this hare often is killed by hunters. This is the most endangered *Lepus* species and needs urgent attention (Flux and Angermann, 1990). Among the activities needed to save this hare are status surveys, regulation of hunting, habitat conservation and management, research, captive breeding, and education programs (Chapman et al., 1990).

Figure 2 was drawn by M. C. Reséndiz, and the photos in Fig. 1 were taken by D. Camarillo. I am grateful to T. Alvarez-S., F. Chiang, and R. Bye for reviewing an early draft of the manuscript. This project was supported in part by the Consejo Nacional de Ciencia y Tecnología, México (grant P228CCOX891634 to F. A. Cervantes), MacArthur Foundation (grant 282.311.010 to V. Sánchez-Cordero

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